

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

ERRATUMSPECIFICATION NO. 659954

Page 1, line 1, for "Peterson" read "Petersen"

THE PATENT OFFICE,
9th May, 1952

DS 15979/1(2)/3324 150 5/52 R

20 upper part which has a downwardly projecting extension of a reduced diameter, to the lower end of which extension the trunk pin is secured, and wherein said piston also comprises a lower part which forms the skirt of the piston and has a screw threaded connection with the extension of the upper part in the vicinity of the lower edge of said extension, a groove for the reception of piston rings being formed at the outer periphery of the extension of the upper part between the 25 upper end of the skirt and a lower end of the crown.

By this construction a trunk piston is obtained by which the forces acting on the top of the piston are transmitted directly to the trunk pin without applying any stresses to the piston skirt, while at the same time effective and uniformly equalized cooling of the end of the piston adjacent to the working space is achieved. The mounting of the 40 trunk pin in the piston will cause no deformation of the latter, and as the force is led directly from the upper part down to the trunk pin no deformation of the skirt proper will occur under the influence of forces due to the working pressures. The cooling space 45 is situated in the material of the upper piston part proper and there are therefore no joints

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piston rings is reduced considerably. The screw threaded connection between the upper piston part and the skirt is located at a substantial distance from the working space proper and is therefore not exposed to deformation due to heating.

In one embodiment of the invention, the cooling chamber of the crown is situated almost at the level of the transition between the upper piston part and its downwardly projecting extension, and thus a great part of the heat absorbed from the working space is absorbed by the cooling medium before said heat reaches the level of the piston rings. The inlet and outlet of the cooling 80 medium is conveniently effected through channels in the wall of the extension terminating on the underside of the latter and communicating with corresponding channels in the trunk pin attached to the underside of the 85 extension. These channels in the trunk pin may, in the usual way communicate with channels in the connecting rod.

The invention is illustrated in the accompanying drawing which shows, partly 90 diagrammatically, a vertical section through an embodiment of a trunk piston in accordance with the invention.

In the drawing, 1 designates the piston

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COMPLETE SPECIFICATION.

Improvements in or relating to Trunk Pistons.

I, OVE PETERSON, a subject of the King of Denmark, of No. 3, Dronningemarken, Gentofte, Denmark, do hereby declare the nature of my invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to a trunk piston of the kind wherein the trunk pin is carried by supporting members projecting from the bottom of the piston instead of, as is usually the case, being inserted in bosses on the inside of the piston skirt.

According to the present invention a trunk piston of the kind above referred to comprises an upper part forming the crown of the piston and containing a cooling chamber that is completely enclosed by the material of said upper part which has a downwardly projecting extension of a reduced diameter, to the lower end of which extension the trunk pin is secured, and wherein said piston also comprises a lower part which forms the skirt of the piston and has a screw threaded connection with the extension of the upper part in the vicinity of the lower edge of said extension, a groove for the reception of piston rings being formed at the outer periphery of the extension of the upper part between the upper end of the skirt and a lower end of the crown.

By this construction a trunk piston is obtained by which the forces acting on the top of the piston are transmitted directly to the trunk pin without applying any stresses to the piston skirt, while at the same time effective and uniformly equalized cooling of the end of the piston adjacent to the working space is achieved. The mounting of the trunk pin in the piston will cause no deformation of the latter, and as the force is led directly from the upper part down to the trunk pin no deformation of the skirt proper will occur under the influence of forces due to the working pressures. The cooling space is situated in the material of the upper piston part proper and there are therefore no joints

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through which the cooling medium may leak out on to the cylinder wall. No great difficulty is experienced in unscrewing the skirt from the upper piston part, so that not only the piston rings but also the grooves in which the latter are mounted can be exchanged in case of wear. In this connection it is of importance that the piston rings can be fitted and removed without it being necessary to expand them over the largest diameter of the piston. The piston ring grooves may be formed by separate chamber rings, the groove-forming surfaces of which may be ground to provide the desired groove-dimensions to receive the piston rings. The piston rings may in all cases be mounted so as to have no direct contact with the material of the crown, whereby heat conduction to the piston rings is reduced considerably. The screw threaded connection between the upper piston part and the skirt is located at a substantial distance from the working space proper and is therefore not exposed to deformation due to heating.

In one embodiment of the invention, the cooling chamber of the crown is situated almost at the level of the transition between the upper piston part and its downwardly projecting extension, and thus a great part of the heat absorbed from the working space is absorbed by the cooling medium before said heat reaches the level of the piston rings. The inlet and outlet of the cooling medium is conveniently effected through channels in the wall of the extension terminating on the underside of the latter and communicating with corresponding channels in the trunk pin attached to the underside of the extension. These channels in the trunk pin may, in the usual way communicate with channels in the connecting rod.

The invention is illustrated in the accompanying drawing which shows, partly diagrammatically, a vertical section through an embodiment of a trunk piston in accordance with the invention.

In the drawing, 1 designates the piston

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head, the upper part of which forms the crown of the assembled piston, said head having a downwardly-projecting extension 2 of a somewhat smaller diameter. On the lower end of said extension, a trunk pin 3 is clamped by means of bolts 11, and the upper end of a connecting rod 18 is journaled in the usual way on the central part 8 of the trunk pin.

10 A tubular piston skirt 4 is screwed on to the extension 2 by means of a screw thread 14 placed in the vicinity of the lower end of said extension in such a way that between the upper end of the skirt and the lower end of the piston head a circumferential groove 5 is produced in which the piston rings are mounted. In the embodiment shown the piston rings 17 are placed in grooves produced by means of a series of chamber rings 15 and 16 clamped between the upper end of the skirt and the lower end of the crown, but the piston rings may also be placed in grooves in a bushing in one piece or a similar carrying body may be inserted in the groove 5.

25 In line with the upper end of the groove 5, the piston head has a cooling chamber 6 situated between the end surface of the piston and a partition 7' having an opening of a suitable size closed by a screwed-in plug 7. From the cooling chamber 6, axial bores 9 and 10 lead down through the extension 2 and connect at the inner end thereof with corresponding bores 12 and 13 in the trunk pin. These bores in turn communicate by means of radial bores and peripheral grooves in the trunk pin bearing with suitable channels in the connecting rod 18, so that a cooling medium, preferably lubricating oil, can be made to circulate through the cooling chamber. It will be seen that there is no possibility of the cooling medium reaching the cylinder wall either from the cooling chamber proper or from the bores and channels leading to the latter even if leakages should occur, as cooling medium that might ooze out can only emerge inside the piston and will from there be led down into the crank case. The same applies when the inlet and outlet of cooling medium is effected by means of telescoping pipes or knee pipes, e.g. connected directly to bores in the extension 2.

The invention is not limited to the embodiment shown and described. The trunk pin may e.g. be secured to the piston head in some other way than by the bolts 11. The lower end of the extension may have bosses or lugs through which the trunk pin is forced in the usual way before the skirt is screwed on. Scraper rings are shown at the lower end of the skirt. If desired, sealing rings proper may also be mounted in the skirt, e.g. in the upper part of the latter which may be carried somewhat higher up than shown, so that only the most strongly heat-influenced piston rings are placed in the groove formed between the crown and the skirt.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A trunk piston of the kind having a trunk pin carried by supporting members projecting from the bottom of the piston, wherein the piston comprises an upper part forming the crown (1) of the piston and containing a cooling chamber that is completely enclosed by the material of said upper part which has a downwardly-projecting extension (2) of a reduced diameter, to the lower end of which extension the trunk pin (3) is secured, and wherein said piston also comprises a lower part which forms the skirt (4) of the piston and has a screw threaded connection with the extension (2) of the upper part in the vicinity of the lower edge of said extension, a groove (5) for the reception of piston rings (17) being formed at the outer periphery of the extension (2) of the upper part between the upper end of the skirt (4) and a lower end of the crown (1).

2. A trunk piston as claimed in claim 1, wherein the cooling chamber (6) in the piston crown is situated almost at the level of the transition between the upper piston part and its downwardly-projecting extension (2).

3. A trunk piston for internal combustion engines, compressors, pumps, and other piston engines substantially as described and/or shown.

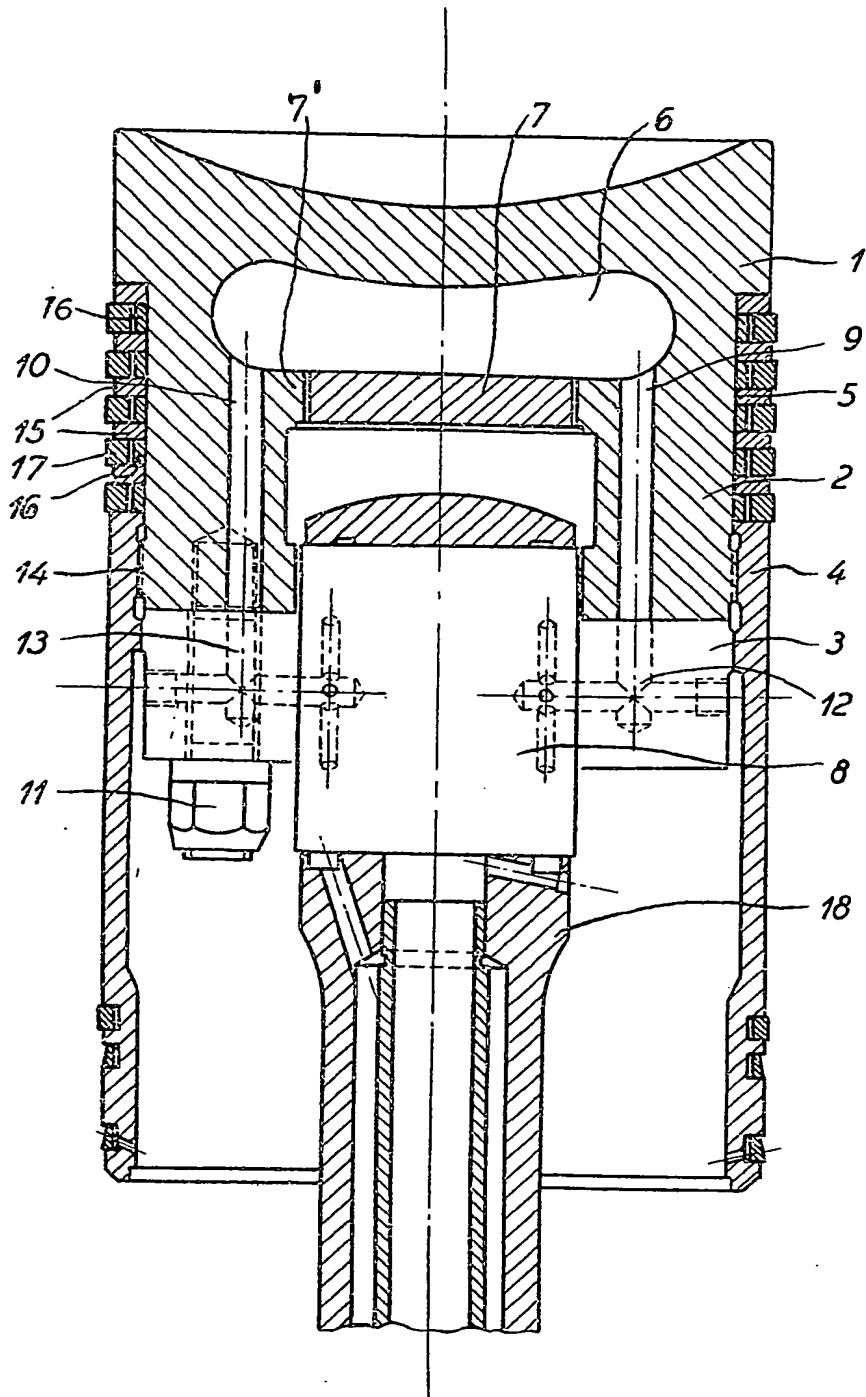
Dated this 23rd day of May, 1949.

REDDIE & GROSE

Agents for the Applicant.

6, Breams Buildings, London, E.C.4.

This Drawing is a reproduction of the Original on a reduced scale



H.M.S.O. (M.F.P.)